

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2015
EXAMINATION CATEGORY: TECHNICAL**

PAPER III: SUBJECT SPECIALIZATION PAPER for *Animal Science*

Date	: 11 October 2015
Total Marks	: 100
Examination Time	: 150 minutes (2.5 hours)
Reading Time	: 15 Minutes (prior to examination time)

GENERAL INSTRUCTIONS:

1. Write your Roll Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is being provided to check the number of pages of Question Paper, printing errors, clarify doubts and to read the instructions. You are NOT permitted to write during this time.
3. This paper consists of **TWO SECTIONS**, namely SECTION A and SECTION B:
 - **SECTION A** has two parts: Part I - 30 Multiple-Choice Questions
Part II - 4 Short Answer QuestionsAll questions under SECTION A are COMPULSORY.
- **SECTION B** consists of two Case Studies. Choose only **ONE** case study and answer the questions under your choice.
4. All answers should be written with correct numbering of Section, Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating any or correct Section, Part and Question Number will NOT be evaluated and no marks would be awarded.
5. Begin each Section and Part in a fresh page of the Answer Booklet.
6. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
7. Use of any other paper including paper for rough work is not permitted.
8. You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.
9. This paper has 09 printed pages in all, including this instruction page.

GOOD LUCK!

SECTION A

PART I - Multiple Choice Questions (30 Marks)

Choose the correct answer and write down the letter of the correct answer chosen in the Answer Booklet against the question number. E.g. 31 (c). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. An animal whose body temperature changes with the temperature of its surroundings is called:
 - a. An Endotherm
 - b. Vertebrate
 - c. Poikilotherm
 - d. Homeotherm

2. A milky white substance produced by worker honey bees and fed to larvae which are being raised as potential queen bees is called:
 - a. Royal Jelly
 - b. Nectar
 - c. Jelly Bean
 - d. Honey

3. The application of estrous synchronization in cattle enables improvement in genetic base of the herd. Which of the following two hormones are used in estrus synchronization?
 - a. GnRH + bGH
 - b. PGF2 α & LH
 - c. GnRH & LH
 - d. PGF2 α & GnRH

4. What will be the daily dry matter intake (DMI) for an adult pure Jersey cow with live body weight of 450 kg in 3rd lactation producing 23 litres of milk:
 - a. 15.75 kg
 - b. 23.37 kg
 - c. 19.53 kg
 - d. 17.31 kg

5. A potential poultry farmer has established a deep litter house measuring 4m by 9m for layer birds. Considering the optimal space requirement for birds, what would be the total layer stock you would advise in the above space?
 - a. 430 - 500
 - b. 350 - 420
 - c. 180 - 250

- d. 270 - 340
6. Which of the following fertility factor is not tested in a breeding soundness evaluation of a bull?
- Scrotal circumference
 - Libido
 - Semen quality
 - Mating ability
7. A farmer complains of fishes dying in his backyard freshwater pond. On closer observation, you find that the pH of the water is abnormally high causing the death of fishes. What would be your immediate and long term recommendations for the farmer?
- Calcium carbonate and lime stones
 - Sodium bicarbonate and chemical fertilizer
 - Boric acid and borate chloride
 - Alum and decomposable organic fertilizer
8. Which of the following is a biogas produced from animal waste?
- Hexane
 - Methane
 - Octane
 - Butane
9. Which of the following vaccine is not included in the national vaccination schedule for animals in Bhutan?
- R₂B vaccine
 - IBD vaccine
 - DHPPi/L vaccine
 - Anti-rabies vaccine
10. Frankfurter, Salami, Bratwurst and Pepperoni are the types of:
- Bacon
 - Cheese
 - Casings
 - Sausages
11. What will be the manure volume produced by 10 cow milking unit in 120 days with average weight of 350 kg with free stall housing facility. The manure is kept for 120 days to form a compost.
- 1800 cu. ft.
 - 4300 cu. ft.
 - 9000 cu. ft.

- d. 12000 cu. ft.
12. Which of the following organism is used for fermenting milk to produce yoghurt as cultures?
- Campylobacter jejuni*
 - Pseudomonas aeruginosa*
 - Mycobacterium chelonae*
 - Streptococcus bulgaricus*
13. The National Dairy Development Centre, plans to establish pasture on 2 acres land at Yusipang (below NDDC office complex, altitude 2500 masl). What pasture species combination would you advise?
- Cock's foot and Italian rye grass
 - Ruzi and red clover
 - White clover and paspalum
 - Tall fescue and molasses
14. How long can you preserve butter at -20°C freezer for domestic consumption?
- 10 - 12 months
 - 19 - 24 months
 - 6 - 9 months
 - 15 - 18 months
15. A farmer from Damthang (altitude 2300 masl) complains of broiler mortality in his farm. Investigation findings show that the broiler stock has pulmonary hypertension secondary to high altitude-associated hypoxia: What is the condition called:
- Angara disease
 - Ascites Syndrome
 - New World Screwworm
 - Railletiniasis
16. Data can be plotted in a frequency distribution to show the general shape of the distribution and represent the "center" of the distribution. These statistics are commonly referred to as measures of central tendency. Which of the following is not a measure of central tendency?
- Median
 - Mean
 - Mode
 - Standard deviation

17. Major program of the Department of Livestock for the 11th Five Year Plan (2013-2018) is:
- Commodity and Highland Program
 - Accelerating Bhutan's Socio-economic Development (ABSD) Program
 - One Gewog Three Product (OGTP) Program
 - Gewog Centric Development Program
18. Fermented, high-moisture stored fodder made from grass crops such as maize or sorghum using the entire green plant that can be fed to ruminants is called?
- Roughage
 - Haylage
 - Silage
 - Ensilage
19. A farmer reports that one of his high producing dairy cow shows increased sexual behavior. The cow mounts other cows excessively, act like a bull and have a significant decrease in milk production. What could be the appropriate underlying cause of this condition?
- Pica
 - Anestrous
 - Silent heat
 - Follicular cystic disease
20. The ability of livestock to turn feed mass into body mass is called?
- Feed Conversion Efficiency (FCE)
 - Feed Conversion Rate (FCR)
 - Feed Conversion Ratio (FCR)
 - All of the above
21. Xylazine: Ketamine can be used as an effective restraint anesthesia for translocation of wild animals at 1:2 combination. Xylazine is available as 10% xylazine hydrochloride and ketamine as 100mg/ml solution. With the dose rate of 2.2 mg/kg xylazine and 4.4 mg/kg ketamine, what volume of mixture is required for a bear weighing 60 kg?
- 3.96 ml
 - 1.54 ml
 - 6.69 ml
 - 5.48 ml

22. A method of crossing of a hybrid with one of its parents or an individual genetically similar to its parent, in order to achieve offspring with a genetic identity which is closer to that of the parent is called:
- Inbreeding
 - Cross breeding
 - Backcrossing
 - Out crossing
23. A poultry farmer seeks your advice on the number of drinkers to be placed in his 2000 layer house. He has already placed feeders at the rate of 1:20. How many drinkers would you advise?
- 30 - 60
 - 80 - 100
 - 120 - 140
 - 160 - 180
24. When did the Ministry of Agriculture and Forests endorse the Livestock Rules and Regulations?
- Year 2001
 - Year 2005
 - Year 2008
 - Year 2011
25. You are asked to estimate the point prevalence of abortion in dairy cattle supplied to different Dzongkhags over the last ten years through ABSD program. What type of study would you conduct?
- Case control study
 - Cohort study
 - Longitudinal study
 - Cross sectional study
26. Which of the following production system is against the animal welfare standards?
- Swine Bio-farming
 - Free range poultry
 - Backyard dairy
 - Battery cage poultry
27. An herbivore is an animal that?
- Only eats meat
 - Only eats plants

- c. Only eats protein
 - d. Eats plant matter and meat
28. Which of the following is not a notifiable disease of Livestock in Bhutan?
- a. Foot and Mouth disease
 - b. African Horse Sickness
 - c. Rinderpest
 - d. Classical Swine Fever
29. Which of the following honey bee species is not found in Bhutan?
- a. Apis mellifera
 - b. Apis cerena
 - c. Apis dorsata
 - d. Apis andreniformis
30. The Essential Veterinary Drug Program takes the responsibilities of distributing the veterinary drugs and vaccines to the Dzongkhags. What is the frequency of distribution of drugs to Dzongkhags from Livestock Central Stores?
- a. Once a year
 - b. Twice a year
 - c. Thrice a year
 - d. Four times a year

PART II – Short Answer Type Questions (20 Marks)

Answer ALL the questions. Each question carries 5 marks. Mark for each sub-question is indicated in the brackets.

1. A poultry farmer at Genekha reports high mortality in his broiler farm during winter. On investigation, you find that the intensive broiler farm has inadequate ventilation. Majority of the dead and sick broilers show distended abdomen. In relation to the above statement, answer the following questions.
- a) Diagnose the disease? (1 marks)
 - b) How will you confirm your field diagnosis? (1 marks)
 - c) What are possible preventive and control measures for this disease? (3 marks)

2. Fifteen farmers of Dolepchen under Dorona Gewog, Dagana qualified for BOIC loan to initiate dairy farming. Dolepchen is a beautiful flat valley at 1400 masl but there is no road connectivity. It takes one day for the locals to reach Gewog office. With respect to the above statement, answer the following questions:

- a) What pasture species development would you advise for the group? (1 mark)
- b) Which dairy processing equipments will you prioritize for the group? (1 mark)
- c) What dairy product should the farmers focus on and why? (2 mark)
- d) Briefly outline your breeding plan for the dairy animals? (1 mark)

3. The National Cattle Identification system (NCIS) developed by the National Dairy Development Centre, Yusipang is under trail in selected cattle farms. Although NCIS does not have provision to record health status of animal, provision to link with TADinfo is kept open. In relation to above, answer the following questions.

- a) What identification mark does NCIS use? (1 mark)
- b) What is the full form of TADinfo? (1 mark)
- c) Why is NCIS needed? List at least two advantages of NCIS. (2 mark)
- d) What could be the possible hindrances to successfully identifying all cattle in Bhutan? (1 mark)

4) A farmer in lower Zhemgang reported death of one of his milking cows amidst anthrax outbreak in the area. The visiting team from RLDC on physical examination suspect anthrax, however, the farmer denies and insists that the animal died of strangulation while in tethering. The farmer is reluctant to dispose the carcass as advised by RLDC and intends to consume the meat. In relation to this, answer the following questions.

- a) Will you allow farmer to consume the meat? (1 mark)
- b) Whom do you report if the farmer is adamant and why? (2 mark)
- c) What legal provisions are available if this becomes a legal case? (1 mark)
- d) What options are available to prevent this disease at the farmers level? (1 mark)

SECTION B

Case Study

Choose either Case 1 or Case 2 from this Section. Each Case carries 50 marks. Mark for each sub-question is indicated in the brackets.

Case 1

In 2012, the import of livestock products arrived to the tune of Nu.1.7 billion. This has prompted the Royal Government of Bhutan to invest and achieve greater self-sufficiency in livestock

products. Accordingly the Department of Livestock was allotted 887 acres of government land (gentle slope with rivers on either side) at Samrang to establish livestock mega farms. Department of Livestock planned to establish 50 acres of fish farm, 100 cow dairy unit, 500 heads goat farm, 10000 birds capacity broiler farm, 5000 birds layer farm, 100 heads buffalo farm and product processing centre. In relation to the above statement, answer the following questions:

- i. Considering the bio-security, waste flow and the disease transmission between farms, carefully lay out the location of the above farms with justifications? (15 marks)
- ii. Where would you place the product processing centre and why? (5 marks)
- iii. How much land would you allot for pasture development? What pasture would you recommend? (10 marks)
- iv. Justify whether setting up feed plant at the site is economically viable? (10 marks)
- v. Discuss marketing strategy for the livestock products coming out of Samrang? (10 marks)

OR

Case 2

Despite initiation of livestock breed improvement program for the last two decades, in-country availability of desired quality of breeding stock is still a constraint. Import options are narrowing as the neighboring countries are restricting export of germplasm. In addition, import of livestock is not a good option due to risk of introducing exotic diseases. However, new technologies that can enhance breed improvement are available. In light of these developments, answer the following questions.

- (i) List down the major constraints faced by breed improvement program in the past? (10 marks)
- (ii) In view of the past constraints, what breed improvement strategy would you design for dairy cattle that can show quick results? (10 marks)
- (iii) Discuss application of new technologies with respect to cattle breed improvement that can be applied in Bhutan? (10 marks)
- (iv) Would you consider use of these breed improvement technologies in swine? if yes, which technology and why? (10 marks)
- (v) What strategy would you design for unproductive animals resulting from breed improvement program? (10 marks)